ZOOLOGY.

THE ANATOMY OF THE HIRUDINEA.—Mr. A. G. Bourne (Quart. Journ. Mic. Sci., July, 1884) contributes the results of observations upon ten genera of Hirudinea extending over a period of four years. His conclusions with regard to the vascular system are, that the whole of the vessels and sinuses are in continuity; that the lateral vessels communicate freely with one another without the intervention of any capillary system, that they possess branches opening into botryoidal or other capillary networks of the "cutaneous" system, and that they form nephridial capillaries and also capillaries upon the intestinal wall. The nephridial capillaries are partly collected again and carried to the capillaries of the cutaneous system, and partly unite to form a vessel which is connected with the perinephrostomial sinus. The dorsal sinus is directly connected with the ventral sinus, and both communicate with: (1) The cutaneous networks; (2) the capillary network upon the walls of the crop; (3) the capillaries upon the intestinal wall and the spiral valve; (4) the perinephrostomial sinuses. The botryoidal and other cutaneous capillary networks communicate with branches of the lateral vessel, and also with the extensions of the dorsal and ventral sinuses, of which the capillaries on the walls of the crop are developments. The vessels of the walls of the gastro-ileal tube are directly derived from branches of the lateral longitudinal vessels; the ventral sinus contains the nerve chain, the perinephrostomial sinus contains the nephridial funnel, and the network of capillaries on the testicular wall potentially contains the testis. The lateral vessels and their branches have a definite muscular wall, wanting only on their smaller branches and capillaries, but the dorsal and ventral sinuses, and the extensions in connection with them, containing organs, or forming a complete network around organs, have no muscular tissue in their walls. These latter, therefore, represent the "cœlom," while the lateral vessels and branches represent a vascular system which has not become quite closed.

The writer leaves unsettled the vexed question of the relationship of the leeches to other Vermes, but appears on the whole more inclined to approach them to the Platyelminths than to the Chætopoda.

NEUMAYR'S CLASSIFICATION OF THE LAMELLIBRANCHS.—Neumayr (Sitz. k. Akad. der. Wiss. Wien, 1883) gives a new classification of the lamellibranchs, founded upon the hinge. The oldest forms have no, or only the faintest, trace of hinge-teeth, the shells are thin, and there is usually neither mark of muscle or of pallial sinus. For these forms, supposed to have two equal adductor muscles and an entire mantle-line, the order Palæconchæ is proposed. From these are supposed to diverge the Desmodonta, without hinge-teeth or with irregular hinge-teeth, with

two equal adductor muscles and with a pallial sinus; and the Taxodontæ, with numerous undifferentiated teeth and two equal muscles. To the first of these groups belong the Pholadomyidæ, Corbulidæ, Myidæ, Anatinidæ, Mactridæ, Paphidæ, Glycimœridæ and Solenidæ?, and to the second the Arcidæ and Nucalidæ. The Tubicolæ form a suborder of the Desmodonta. From the Taxodonta branch off in one direction the Heterodonta, with distinct cardinal and lateral teeth fitting into each other and two muscle-impressions (Najadæ, Cardinidæ, Astartidæ, Crassatellidæ, Megalodontidæ, Chamidæ (Rudistes) (Tridacnidæ), Erycinidæ, Lucinidæ, Cardiidæ, Cyrenidæ, Cyprinidæ, Veneridæ, Gnathodontidæ, Tellinidæ, Donacidæ), and in another, the Anisomyaria, with irregular or no hinge-teeth, two unequal muscles or one only, and no pallial sinus. These form two suborders, Heteromyaria (Aviculidæ, Mytilidæ, Prasinidæ, Pinnidæ) and Monomyaria (Pectinidæ, Mytilidæ, Spondylidæ, Anomidæ, Ostreidæ). The Trigonidæ are considered a suborder of Heterodonta.

Antennary Gland of Cytheridæ.—W. Müller-Blumenau has discovered that *Elpidium brossliarum* is able to secrete a sticky material while in water; the observations made in connection with this discovery led him to the belief that the animal was able to spin, and that the spinning organ was placed in the second pair of antennæ. The organ so well known to be present at the base of this pair of appendages has been supposed to be poisonous in function, but no direct observations have ever been made in support of this view, and it is opposed by the delicate nature of its flagellum, which could never be supposed to be capable of inflicting a wound. When the animal is found hanging to glass its anterior end is always nearest to the glass, and the creature takes an oblique position. The author points out the difficulties presented by the habits of the animal in determining the question which he has investigated, but it would seem to be certain that the antennary gland is possessed of the power of secreting an attaching thread.—*Journ. Royal Microscopical Society, Dec.*

An Eyeless Eel.—Some years ago a very aristocratic house at Elizabeth was deserted because of the belief that it was haunted. Not long ago it passed into new hands. An old well was then uncovered, and the bottom cleaned. In doing this an eel (*Anguilla rostra*) some fourteen inches long and pretty thick for its length, was brought to the surface. It was quite blind, and in appearance to the ordinary observer was even eyeless. My wife and one of my sons saw it, and such was their opinion. —*S. Lockwood.*

Temperature and Hibernation.—In the January Naturalist (p 37), was an interesting article on the hibernation of the lower vertebrates. The author referred to hibernation as being in some

cases a voluntary act. Some of the observations on animals confined in our laboratory for the purpose of study, may throw more light on this subject. These animals are all well known species, and our aim is usually to keep them in surroundings as nearly like their natural habitations as possible. The temperature cannot, in the single room at present devoted to this use, be kept at a degree which will suit the habits of all of them, but the effects of its change on each is noted.

A number of frogs (*Rana halecina*) were placed in a closed glass case, with growing plants to study the balancing effect of their respiration. Plants and frogs seemed to thrive excellently, and during the four months trial, the temperature being kept at about 70° F., the latter showed no evident signs of hibernation, though the case stood in front of a window against which the snow was often falling. To observe the effect of a lower temperature, the case was moved to a cooler place (40°), and immediately the frogs, *using their front legs like dogs*, dug under the moss and stones, and remained out of sight until the former temperature was renewed. Similar experiments tried with salamanders, snakes, toads, houseflies and hornets, revealed at once a desire to hide during the lower temperature, but a complete absence of any such tendency when the normal degree of heat was preserved. In every one of these cases and a number of others, hibernation seemed to be forced. If the temperature was lowered, and they were at the same time prevented from burying themselves, they gradually became stiff and lifeless, but could in every case tried, except the last two mentioned above, be resuscitated upon the application of heat.

During this last fall a scorpion, shipped from the South in a bunch of bananas, was subjected to like treatment with the same results. When cold it was so helpless that it could be handled with impunity; but when its box was placed near the fire, it would dart about with elevated tail in the manner peculiar to itself.

With some of our animals experiments have given different results. A wood-tortoise, though given a warm corner near the fire, could not be persuaded to pass the winter above ground. It exhibited very evident signs of uneasiness as the snow came, and, as soon as material was furnished, burrowed out of sight. The same was true of a number of crayfish in our collection.

Not the least interesting among our pets is a pair of opossums (*Didelphys virginiana*). This animal is popularly believed not to go into winter quarters in this latitude; experiment thus far has shown that they remain in a semi-dormant condition, and take no food—a remarkable fact for opossums, when the conditions demand inaction. Their den was placed by a window on the north side of the building. Their food has remained untouched for more than a fortnight, and when viewed from the inside of the

window they are found to be curled up together in their straw nest. It may be that in this case "possuming" is only another word for hibernating.

All of our experiments lost a part of their value because the animals are in confinement; but, with the two exceptions given above, where habit controlled, all seemed to prove that hibernation is not an inherited and peculiar trait, but one that may be adopted when the conditions demand it. The NATURALIST shall hear of our further work in this direction.—*W. W. Thoburn (Laboratory of Illinois Wesleyan University).*

THE CHAMELEON VIVIPAROUS.—According to the newspapers a United States vessel recently arrived at Brooklyn which had taken on some animals at Capetown, Africa, among these was a female chameleon which during its passage gave birth to eleven young ones, all of which died.—*S. Lockwood.*

A CROW CRACKING CLAMS.—My son-in-law assures me that years ago it was not so rare to see, at Port Monmouth, the common crow (*Cervus americanus*) take a quahog (*Venus mercenaria*) up high in the air and drop it on a certain fence with a flat top-rail, thus cracking it. The sight has been witnessed by several persons. He was not able to say *how* the bird carried the bivalve, but it is supposable in its claws. It must have required nice calculating certainly.—*S. Lockwood.*

THE TURKEY BUZZARD BREEDING IN PENNSYLVANIA.—On May 20, 1882, I visited a "nest" of the turkey buzzard (*Cathartes aura* Illig.) in the lower part of Chester county, Pa. The locality was a deep wood bordering upon one of the tributaries of the Brandywine; the eggs, two in number, were deposited under a low, shelving rock, on the bare ground. The female bird was setting when I approached, but immediately flew off uttering a harsh "squak" and discharging a mouthful of carrion. She lit upon a dead tree near by, and remained there with her wings extended watching me. The male bird circled about over the wood but did not alight.

On May 22d of the same year I found another pair breeding in a similar situation on the farm of Mr. T. Dutton Steele, in East Bradford township, Chester county. The eggs in this case were laid on the ground at the foot of a large rock; they were longer than the others and not so thickly marked.

Several other "nests" were found during the same season, and in one instance the eggs were deposited in an old stump. The eggs were dirty white, spotted irregularly with reddish brown and purple.—*Witmer Stone, Germantown, Pa.*

A BEAVER DAM BUILT WITHOUT WOOD.—The idea that the beaver must have wood with which to build his dam is so universal that an exception to the rule seems worthy of record.

In September of 1883, near the headwaters of Beaver river,

Dakota, the writer discovered a dam freshly built of mud, and coarse, marshy plants. No trees or bushes could be seen anywhere in the vicinity. It was about twenty-five feet in length, thrown across a sluggish stream about half that width. Its level top was about four feet higher than the bottom of the channel. The dam was not more than half-filled with water.—*J. E. Todd.*

THE WILD HORSE OF THIBET.—The celebrated traveler, Przevalsky, on his return from his third great journey in Central Asia, brought to St. Petersburg an example of a new species of Equus. This was described in 1881 by Mr. J. S. Poliatow as *E. przevalsky.* It has warts on its hind-legs as well as on its fore-legs, and has broad hoofs. These characters ally it to the true horse, but the long hairs of the tail do not commence until about the middle of that appendage. It is thus intermediate between the horse and the asses, to which category the other known wild species of Equus belong. Its mane is short and erect, there is no forelock, and no trace of a dorsal stripe. The stature is small, the legs very thick and strong, the head large and heavy, and the ears smaller than in the asses. In color, it is whitish gray, paler and whiter beneath and reddish on the head, and on the upper part of the legs, which are blackish from the knee downward.

Przevalsky's wild horse inhabits the great Dsungarian desert between the Altai and Tianschan mountains. The Tartars call it "Kertag," and the Mongols "Statur." It goes in troops of from five to fifteen, led by an old stallion. It is lively, very shy, with sight, smell, and hearing well-developed, so that it is exceedingly difficult of approach. It seems to prefer the saline districts, and to be able to do without water for long periods. Thus it can only be hunted in the winter, when melted snow can be obtained. Przevalsky only met with two herds during his whole stay in the desert. The only specimen brought to Europe is in the museum of the St. Petersburg Academy of Sciences.

ZOOLOGICAL NOTES.—*Sponges.*—Professor W. S. Sollas has recently studied the development of *Halisarca lobularis* from specimens obtained at Roscoff. Schulze, whose specimens were taken in the Mediterranean, found that the development of the young within the parent sponge did not proceed further than the formation of the blastula, or at most of an incipient gastrula; whereas in those observed by Sollas the embryo became much developed within the parent, and the blastula stage was slurred over, apparently to economize space. No segmentation cavity was observed, but directly a cavity was necessary, the loosely aggregated cells of the morula packed themselves closely together to form the wall of the unfinished blastula, leaving their overplus in the interior in irregular heaps which subsequently arranged themselves into a unicellular layer along the line of the infolding wall of the gastrula. Professor Sollas attributes the

difference in development between the Mediterranean and Roscoff specimens to the difference of conditions, the former sea being without heavy tides and powerful currents, so that the larvæ can safely issue into the water at an early stage.——Dr. Sendenfeld claims, in *Zool. Anzciger*, Jan. 26, to have discovered a scattered system of mesodermal nerve-cells in several kinds of sponges.

Mollusks.—After a study of the morphology of Rhabdopleura from specimens obtained at Lervik, near Bergen, Norway, Professor E. R. Lankester does not decide whether the form is polyzoan or molluscan, but inclines to the view that both it and Cephalodiscus are degraded lamellibranchs. The colony consists of branching tubes, built of a series of rings, each of which is separately secreted and added to its predecessors by the so-called buccal shield or pre-oral lobe of the polypide. A completed branch ends in an upstanding polyp-tube, while in a growing branch the axis runs beyond the last erect polyp-tube. The axial tube is divided by septa into segments, one corresponding to each polyp. When a bud reaches a certain stage of development it breaks through the wall of its chamber and grows outwards at a sharp angle. Occasionally it atrophies, leaving a sterile chamber. The buccal shield or disk is locomotive as well as secretive, and is covered with fine cilia, which occur also on the lophophoral filaments of the arms right and left of it. In the center of the ringed caulotheca or tube is the axial stalk which connects and bears the polyps. This is soft in the polypides, hard on the stem, but every hard portion is formed by the shrinkage of the soft stalk and the development of a cuticle. An internal skeleton exists in the lophophore and in the axis. The embryology of this curious form is as yet unknown, nor is it known whether the sexes are distinct or the colony persistent from year to year. ——More Pleurotomidæ. Mr. E. A. Smith describes (*Ann. and Mag. Nat. Hist.*, Nov., 1884) thirty additional species of this group.——In the same magazine (Oct.) Dr. R. Bergh has a paper upon the affinities of Onchidia. After an examination of the structure of various organs, the writer arrives at the conclusion that "the Onchidia agree with the Pulmonata in the structure of the nervous system, in the existence of a lung and of a parenchymatous kidney, in the presence of a peculiar pedal gland, and in various peculiarities of the generative system. They branch off from the Pulmonata; they are Pulmonata which have adapted themselves to an amphibiotic or marine mode of life."

Crustaceans.—Among new forms of Crustacea dredged by the *Albatross* in 1883, are an ally of Ethusa, taken in 1496 to 1735 fathoms, a species of Galacantha M. Edwds., in 1479 fathoms, two forms of Pentacheles, between 843 and 1917 fathoms, Notostomus, a Palæmonid, six inches long and of an intense dark crimson, in

1342 fathoms; three species of a new genus allied to Pasiphæ and also to Hymenodora; a Penæid of the genus Aristæas, a foot in length, and a large Sergestes, three inches long. The size of these new shrimps is remarkable, but is greatly exceeded by that of some of the deep-sea crabs. Thus the great spiny *Lithodes agassizii* has a carapace seven inches in length and six in width, and measures above three feet over the outstretched legs.

Arachnidans.—The development of Chelifer differs from that of other arachnids in the existence of a larval state as yet little known, and the structure of which has been found by M. J. Barrois to be more complicated than was stated by Metschnikoff. The number of pairs of feet is five. The nutritive vitellus is surrounded by a layer of exodermal cells preceded by an ample organ of suction opening on the ventral aspect between the two large claws (second pair). The whole forms a digestive apparatus destined to pass nutritive material into the interior of the larva. The larva is fixed upon the ventral face of its mother, and subsists parasitically upon her. The sucking apparatus is destined to fall, and its mode of elimination is singular. In the earlier stage the ventral nervous band consists of two parts, one in front of, the other behind the sucking organ. Afterwards, when the two bands are united into a continuous cord, the sucking organ is thrust outwards, becomes attached only by a thin cord below the definitive mouth, and falls at the same time with the larval envelope.

Fishes.—Karl Mobries, in a letter to *Nature*, maintains that flying fish are incapable of flight "for the simple reason that the muscles of their pectoral fins are not large enough to bear the weight of their body aloft in the air." The pectoral muscles of birds weigh on an average $\frac{1}{6}$ of the total weight of the body, those of bats $\frac{1}{13}$, those of the flying fish only $\frac{1}{32}$. The impulse is given while still in the water by the powerful masses of muscle along the sides of the body, masses which are larger than in any other fishes of similar size. The flickering motion which has been noticed is only a vibration of the elastic membrane of the pectorals, which occurs whenever the fins are in a horizontal position parallel to the wind.

Birds.—M. de Quatrefages (Ann. and Mag. Aug., Sept. 1884), ably maintains against Dr. Haast, the belief that the final extinction of the various species of moa formerly inhabiting New Zealand is due to the Maoris, and not to the preceding Melanesian natives. The discovery of bones to which the muscles and integments still adhere, furnishes a proof of this, as do the traditions of the natives. The last moa hunt of which memory is preserved, according to Mr. White, took place near Whakatone, in the Bay of Plenty. The feathers of birds killed there were until recently in the hands of a chief named Appanui.